

WHAT IS CLAIMED IS:

1. An automatic transmission including plural friction engaging elements configures plural shift ranges based on combinations of each friction engaging element being in engaging or disengaging condition and a controlling unit for controlling the friction engaging elements to be in engaging or disengaging condition by controlling a hydraulic pressure applied thereto, comprising:  
 5 a switching means for switching the condition of the controlling portion to a learning mode for learning a pre-charge time at a predetermined pre-charge pressure;  
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a means for determining the pre-charge time activated upon the leaning mode based on input values indicating at least a turbine rotation number, wherein

the means for determining the pre-charge time on condition that a vehicle is not traveling and the controlling unit is switched to the learning mode,  
 15 includes:

a means for moving the friction engaging element toward engaging side by controlling the hydraulic pressure applied to the friction engaging element to be at the predetermined pre-charge pressure by the controlling portion while an input shaft rotating number of the automatic transmission is constant;  
 20 a means for measuring and memorizing the input values with predetermined intervals in a predetermined determining cycle; a means for learning and setting a current time as the pre-charge time when a change of the input value due to a decline of the turbine rotation number within the determining cycle fulfills a predetermined noise eliminating condition and a differential  
 25 between a current input value and a former input value and a differential between the former input value and a last but one input value exceed a predetermined threshold.

30 2. An automatic transmission according to claim 1 further comprising an input means for detecting an engine rotation number, wherein the means for

determining the pre-charge time uses a rotation number differential between the turbine rotation number and the engine rotation number as the input value.

3. A method for setting the pre-charge time for an automatic transmission including plural friction engaging elements configures plural shift ranges based on combinations of each friction engaging element being in engaging or disengaging condition, a controlling unit for controlling the friction engaging elements to be in engaging or disengaging condition by controlling a hydraulic pressure applied thereto, comprising:

a process for determining the pre-charge time based on input values indicating at least a turbine rotation number on condition that a vehicle is not traveling; a process for moving the friction engaging element toward engaging side by controlling the hydraulic pressure applied to the friction engaging element while the pre-charge time is set at the predetermined pre-charge pressure by the controlling unit when an input shaft rotating number of the automatic transmission is constant;

wherein the process for determining the pre-charge time includes:

a process for measuring and memorizing the input values with predetermined intervals in a predetermined determining cycle;

a process for learning and setting a current time as the pre-charge time when a change of the input value due to a decline of the turbine rotation number within the determining cycle fulfills a predetermined noise eliminating condition, and a differential between a current input value and a former input value and a differential between the former input value and a last but one input value exceed a predetermined threshold.

4. A method for setting a pre-charge time according to claim 3, wherein the process for determining the pre-charge time uses a rotation number differential between the turbine rotation number and the engine rotation number as the input value.